

Interpreting Velocity-Time Graphs.pdf - Adobe Reader

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Interpreting Velocity-Time Graphs

The motion of a two-stage rocket is portrayed by the following velocity-time graph.

Velocity (m/s)

Time (s)

Several students analyze the graph and make the following statements. Indicate whether the statements are correct or incorrect. Justify your answers by referring to specific features about the graph.

Student Statement	Correct? Yes or No
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(a) Written description of motion:

14

(a)

0-1s: + dir, speeding up, + accel.

1-4s: + dir, speeding up, + accel.

4-9s: + dir, slowing down, - accel

9-14s: - dir, speeding up, - accel

(b)

(b) Particle model of motion

9-14s: - dir, speeding up, - accel

(b)

(c)

0-1s:
 $\bar{a} = \frac{40 - 0 \frac{m}{s}}{1 - 0 s}$

1-4s:
 $\bar{a} = \frac{100 - 40 \frac{m}{s}}{4 - 1 s}$
 $\bar{a} = 20 \text{ ms}^{-2}$

4-9s:
 $\bar{a} = \frac{0 - 100 \frac{m}{s}}{9 - 4 s}$

9-14s:
 $\bar{a} = \frac{-100 - 0 \frac{m}{s}}{14 - 9 s}$

(c) Acceleration calculations

9-14s: - dir, speeding up, - accel

(b)

(c)

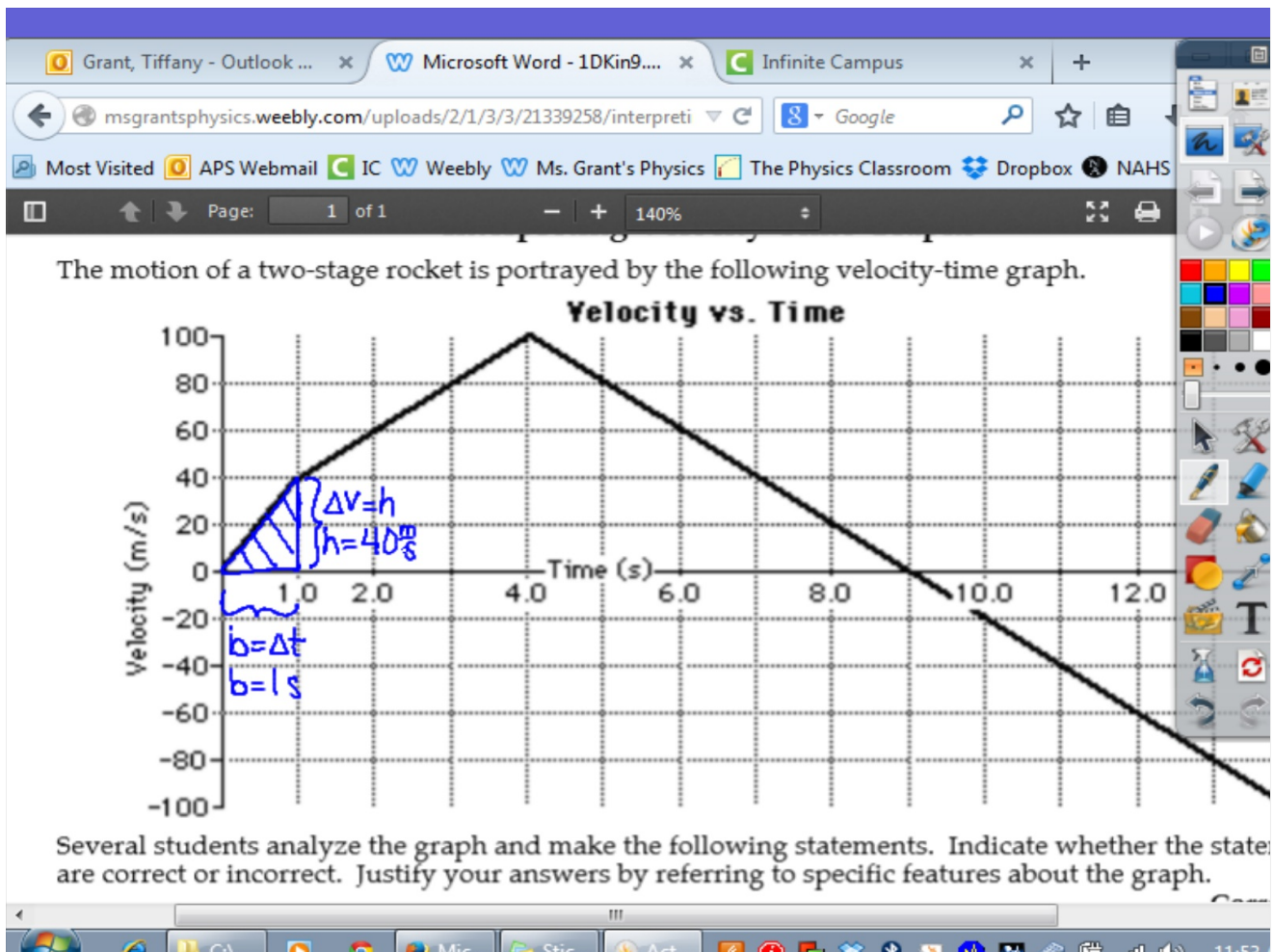
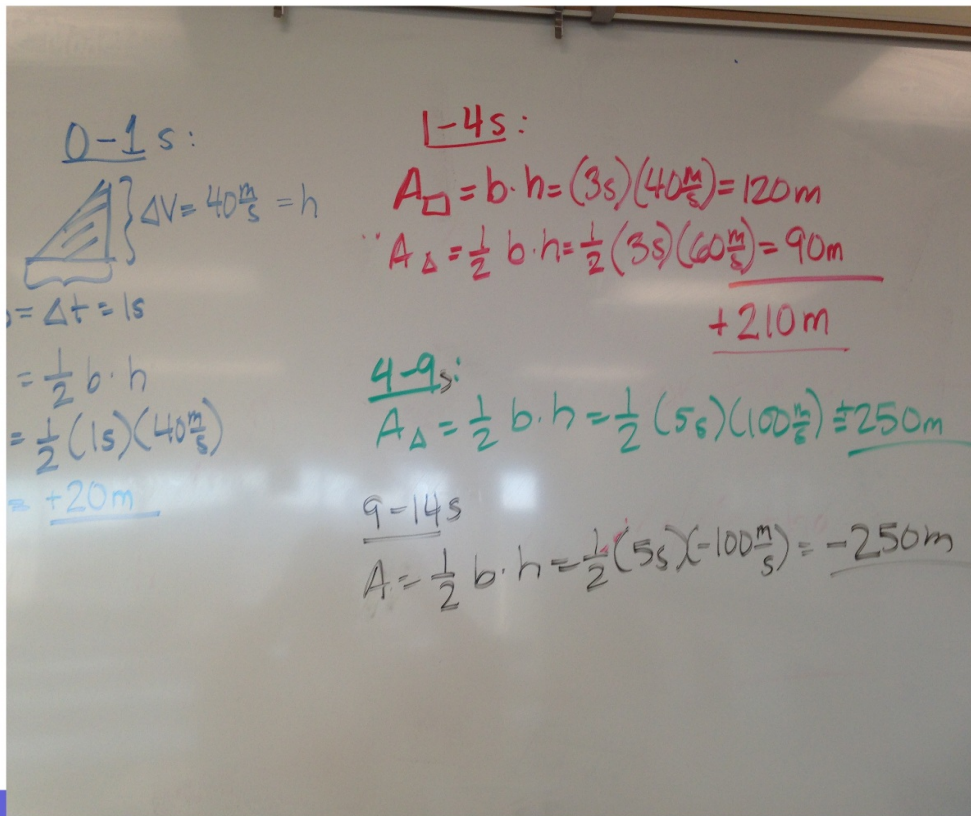
0-1s:
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 $\bar{a} = 40 \text{ ms}^{-2}$

1-4s:
 $\bar{a} = \frac{100 - 40 \frac{m}{s}}{4 - 1 s}$
 $\bar{a} = 20 \text{ ms}^{-2}$

4-9s:
 $\bar{a} = \frac{0 - 100 \frac{m}{s}}{9 - 4 s}$
 $\bar{a} = -20 \text{ ms}^{-2}$

9-14s:
 $\bar{a} = \frac{-100 - 0 \frac{m}{s}}{14 - 9 s}$
 $\bar{a} = -20 \text{ ms}^{-2}$

(d) Displacement calculations



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The motion of a two-stage rocket is portrayed by the following velocity-time graph.

Velocity vs. Time

Velocity (m/s)

Time (s)

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Velocity vs. Time

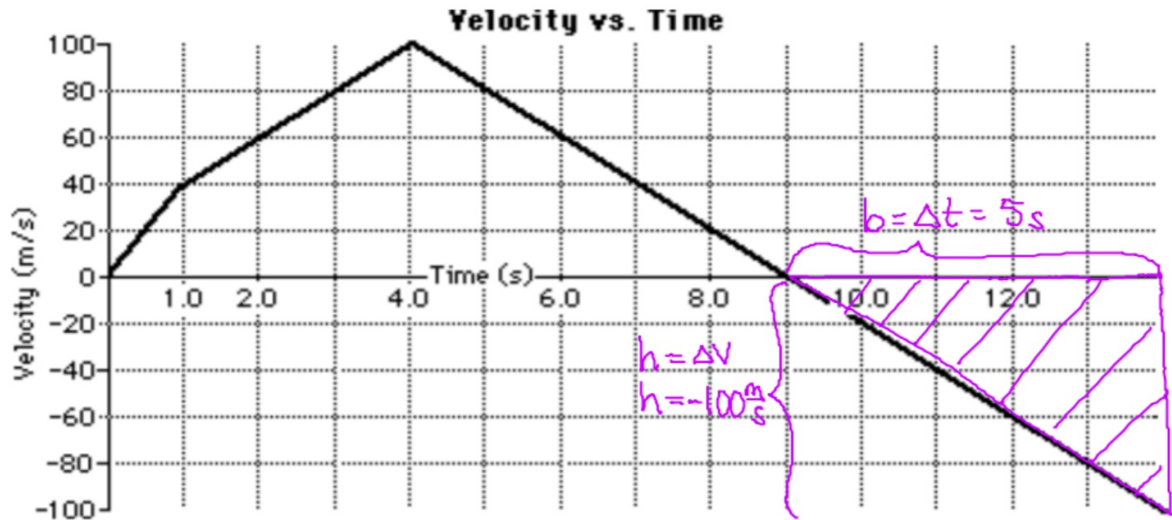
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Time (s)

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Correct?